

1962

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Recommended Citation

Seerley, R.W., "Supplemental L-Lysine in Milo Rations for Growing-Finishing Swine" (1962). *South Dakota Swine Field Day Proceedings and Research Reports, 1962*. Paper 3.
http://openprairie.sdstate.edu/sd_swine_1962/3

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SUPPLEMENTAL L-LYSINE IN MILO RATIONS FOR GROWING-FINISHING SWINE^{1,2,3}

R. W. Seerley

Nutritionists are interested in L-lysine addition to swine rations because: (1) L-lysine is an essential amino acid in the diet for best growth, (2) cereal grains and soybean meal are comparatively low in lysine, (3) proper balance of amino acids in the ration is important for good growth and feed conversion. Some experimental results suggest lysine is not a replacement for protein in the ration but should be added to rations already adequate in crude protein, (4) L-lysine can now be produced by a fermentation process which has lowered the cost.

Previous research at this station showed corn and oat rations were improved by supplemental L-lysine (Swine Day Report, 1960). This experiment was initiated to evaluate L-lysine in milo rations.

Experimental Procedure

Two nearly identical experiments have been conducted. The rations used in the winter experiment (I) had less protein than the summer rations (experiment II). Forty weanling pigs were allotted into 8 equal lots for each experiment. The experimental treatments were:

- Lot 1 - Basal milo ration
- Lot 2 - Basal milo ration / 0.1% L-lysine
- Lot 3 - Basal milo ration / 0.2% L-lysine
- Lot 4 - Basal milo ration / 0.3% L-lysine

Rations formulated for each experiment are shown in table 1.

Pigs were confined to an 8x10 ft. sleeping area and an outside feeding area 8 X 12 feet. As individual pigs weighed 200 pounds or more, they were removed from the experiment and slaughtered. Slaughter data collected were average backfat, carcass length, loin eye area and per cent lean cuts.

Results and Discussion

Tables 2 and 3 summarize experiments I and II, respectively. Fortified milo-soybean meal rations supported good growth, but lysine improved the rations. In experiment I pigs fed 0.1%, 0.2% or 0.3% lysine gained 3.5%, 4.7% and 10.7% faster, respectively, than control pigs. Growth rate increased as the lysine content was increased in the ration. Pigs in lot 4 (0.3% lysine) went to market 7 days before the control pigs.

¹Supported in part by a grant from Merck and Company.

²Certain ration ingredients were supplied by Merck and Co., Rahway, New Jersey, American Cyanamid Company, Princeton, New Jersey, Eli Lilly and Co., Greenfield, Indiana and Nopco Chemical Co., Newark, New Jersey.

³John Morrell and Co., Sioux Falls, South Dakota assisted with the carcass data.

TABLE 1. COMPOSITION OF RATIONS¹

Ingredient	Experiment I		Experiment II	
	to	after	to	after
	110 lbs.	110 lbs.	110 lbs.	110 lbs.
	lbs.	lbs.	lbs.	lbs.
Milo	863	931	840	926
Soybean meal (44%)	113	41	136	50
Dicalcium phosphate	8	9	8	9
Limestone	9	9	9	9
T. M. salt, hi zinc	5	5	5	5
B vitamin mix, Merck 92	1	1	0.5	0.5
Vitamin B ₁₂ , Merck 20	0.25	0.25	0.25	0.25
Vitamin A and D, Quadrex 10	0.2	0.2	0.2	0.2
Aurofac 10	.5	.5	1.0	.5
Hygromix 8	.75	---	.75	---

¹ In experiment I, L-lysine was added as L-lysine monohydrochloride. In experiment II lysine was added as LYAMINE (20% premix).

Pigs in lot 4 consumed more feed per day than control pigs (6.9 lbs. versus 6.50 lbs.), yet pigs in lot 3 consumed less daily feed than the controls (6.17 lbs. versus 6.50 lbs.).

Feed required per pound of body weight gain was slightly less in lysine lots. Pigs fed 0.2% lysine had the best feed conversion. They required .38 pound less feed per pound of gain than control-fed pigs. Feed cost per 100 pounds of gain increased as the level of lysine increased in the ration. The charge for lysine was \$2.50 per pound of pure lysine.

Supplemental lysine did not have a significant effect on carcass backfat, length per cent lean cuts or loin eye area.

In experiment II there was some variability in growth rate between replicate lots, especially lot 2. Pigs fed 0.1% lysine in replicate I did not gain as fast as pigs fed more lysine, while those in replicate II gained faster than pigs fed 0.2% or 0.3% lysine. An average of both replicates showed that pigs fed 0.1%, 0.2% or 0.3% gained nearly the same and gained 13.3% faster than control-fed pigs.

Feed consumption was equally increased in the lysine lots and feed efficiency was improved by adding lysine to the ration. Pigs fed 0.2% lysine had the best feed conversion (3.41 pounds of feed per pound of gain)-- a 9% improvement over the control pigs. As in experiment I, feed cost per unit of gain increased as the lysine was increased.

Results of slaughter data showed that carcasses may be improved by lysine. As the level of lysine increased backfat decreased and the loin eye area and per cent lean cuts increased. Comparison of carcasses from pigs fed rations without lysine and 0.3% lysine were 1.64 vs. 1.46 inches backfat, 3.35 vs. 3.78 sq. in. loin eye, and 50.24 vs. 52.84% lean cuts, respectively.

TABLE 2. SUMMARY, MILO / L-LYSINE, EXPERIMENT I, 1960

Lot No.		1	2	3	4
L-lysine content, % of ration		0	0.1	0.2	0.3
No. pigs per lot	Rep I	5	5	5	5
	Rep II	5	5	5	5
Av. initial wt., lb.	Rep I	38.8	38.8	38.8	38.8
	Rep II	34.4	34.4	34.4	34.4
Av. final wt., lb.	Rep I	207.6	202.8	207.6	209.0
	Rep II	200.2	204.6	210.8	208.0
Days on experiment	Rep I	100.8	94.2	96.6	91.0
	Rep II	98.8	98.0	99.4	93.8
Av. daily gain, lb.	Rep I	1.67	1.74	1.75	1.87
	Rep II	1.68	1.74	1.77	1.85
	Av.	1.68	1.74	1.76	1.86
Av. daily feed, lb.	Rep I	6.43	6.82	6.49	7.20
	Rep II	6.57	6.20	5.85	6.65
	Av.	6.50	6.50	6.17	6.92
Feed per lb. gain, lb.	Rep I	3.84	3.92	3.71	3.85
	Rep II	3.91	3.57	3.30	3.59
	Av.	3.88	3.74	3.50	3.72
Feed cost/cwt. gain, \$	Av.	9.89	10.47	10.68	12.28
<u>Carcass Data, Replicates I and II Combined</u>					
No. carcasses		8	7	7	7
Av. backfat, inches		1.63	1.66	1.64	1.67
Av. length, inches		29.1	28.8	28.8	28.7
Av. lean cuts, % of carcass wt.		50.08	50.48	50.65	50.40
Av. loin eye, sq. in.		3.80	3.71	4.26	3.98

TABLE 3. SUMMARY, MILO / L-LYSINE, EXPERIMENT II, 1961

Lot No.		1	2	3	4
L-lysine, % of ration		0	0.1	0.2	0.3
No. pigs per lot	Rep I	4 ¹	5	5	5
	Rep II	5	5	5	5
Av. initial wt., lb.	Rep I	47.8	47.6	47.4	47.4
	Rep II	46.6	47.4	47.6	47.6
Av. final wt, lb.	Rep I	185.5	193.8	198.6	204.6
	Rep II	196.2	208.6	207.0	201.4
Days on experiment	Rep I	96.2	91.0	86.8	89.6
	Rep II	96.6	89.6	92.4	92.4
Av. daily gain, lb.	Rep I	1.44	1.61	1.74	1.75
	Rep II	1.55	1.80	1.72	1.66
	Av.	1.50	1.70	1.73	1.71
Av. daily feed, lb.	Rep I	5.50	5.65	5.73	6.12
	Rep II	5.66	6.40	6.08	5.95
	Av.	5.59	6.02	5.91	6.04
Av. feed per lb. gain, lb.	Rep I	3.83	3.52	3.29	3.49
	Rep II	3.65	3.56	3.52	3.58
	Av.	3.73	3.54	3.41	3.53
Feed cost/cwt. gain, \$	Av.	9.51	9.91	10.40	11.65

Carcass Data, Replicate I and II Combined

No. carcasses ²	8	9	10	9
Av. backfat, inches	1.64	1.52	1.50	1.46
Av. length, inches	29.2	29.4	29.8	29.2
Av. loin eye, sq. in.	3.35	3.41	3.81	3.78
Av. lean cuts, % of carcass wt.	50.24	51.76	52.35	52.84

¹ One pig died.

² Experiment was terminated when 4 pigs weighed considerably less than 200 pounds.